

## ABSTRACT OF THE DISCLOSURE

The present invention provides systems, methods, and screens for an optical system analysis of cells to rapidly determine the distribution, environment, or activity of fluorescently labeled reporter molecules in cells for the purpose of screening large numbers of compounds for those that specifically affect particular biological functions. The invention involves providing cells containing fluorescent reporter molecules in an array of locations and scanning numerous cells in each location with a high magnification fluorescence optical system, converting the optical information into digital data, and utilizing the digital data to determine the distribution, environment or activity of the fluorescently labeled reporter molecules in the cells. The array of locations may be an industry standard 96 well or 384 well microtiter plate or a microplate which is a microplate having a cells in a micropatterned array of locations. The invention includes apparatus and computerized method for processing, displaying and storing the data.